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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/993,801	11/14/2001	Hooman Darabi	BP 1988	8869

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EXAMINER	
PHAM, TUAN	

ART UNIT	PAPER NUMBER
2643	

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/993,801	DARABI ET AL.	
	Examiner	Art Unit	
	TUAN A PHAM	2643	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *11-15,29-38,40 and 41* is/are allowed.

6)☒ Claim(s) *1-10,16-28 and 39* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/14/01*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 1-10, 16-20, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peterzell et al. (Pub. No.: US 2002/0132597, hereinafter, "Peterzell") in view of Ninomiya et al. (U.S. Patent No.: 5,940,029, hereinafter, "Ninomiya").

Regarding claim 1, Peterzell teaches an integrated multi-mode radio receiver comprises (see figure 3): shared front-end (see figure 3, LNA 30,

RXBPF 40, RF AMP 50, Mixer 60) operably coupled to receive a radio frequency (RF) signal that is modulated in accordance with one of a plurality of operational modes (see figure 5, duplexer 312, col.4, [0054-0056), wherein the shared front-end converts the RF signal into one of a plurality of intermediate frequency (IF) signals based on a selection signal that is indicative of the one of the plurality of operational modes (see figure 3, plurality of IF filter 70, col.4, [0052-0060]) and multiplexer (i.e., multi pole switch) couple to the share front end (see figure 3, multi pole switch is working the same function as multiplexer).

It should be noticed that Peterzell fails to clearly teach plurality of intermediate frequency (IF) stages; and multiplexor (i.e., Switch) operably coupled to the shared front-end and to the plurality of IF stages, wherein the multiplexor provides the one of the plurality of IF signals to one of the plurality of IF stages based on the selection signal. However, Ninomiya teaches such features (see figure 1, switch 14, plurality IF stage 17n, switch controller 16, col.7, ln.5-52) for a purpose of supporting multi mode receiver.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of plurality of intermediate frequency (IF) stages; and multiplexor (i.e., Switch) operably coupled to the shared front-end and to the plurality of IF stages, wherein the multiplexor provides the one of the plurality of IF signals to one of the plurality of IF stages based on the selection signal, as taught by Ninomiya, into view of Peterzell in order to save the manufacture cost and time to made a small receiver for supporting multi frequencies.

Regarding claim 2, Peterzell further teaches the integrated multi-mode radio receiver, wherein the shared front-end further comprises: low noise amplifier having programmable gain, wherein the low noise amplifier is operably to amplify the RF signal to produce an amplified RF signal, wherein the programmable gain is set within a range of gain based on power level of the RF signal; and mixing module operably coupled to convert the amplified RF signal into the one of the plurality of IF signals based on the selection signal (see figure 5, LNA 320, RXBPF 330, Mixer 340A).

Regarding claim 3, Ninomiya further teaches the integrated multi-mode radio receiver, wherein the plurality of IF stages further comprises: first IF stage including first filtering module and first amplifying module, wherein the first filtering module is operably coupled to filter the one of the plurality of IF signals to produce a filtered IF signal, wherein the first amplifying module amplifies the filtered IF signal to produce a first signal, and wherein gain of the first amplifying module is programmable within an IF gain range based on the power level of the RF signal; and second IF section including second filtering module and second amplifying module, wherein gain of the amplifying module is set to a gain within the IF gain range, wherein the second filtering module is operably coupled to filter another one of the plurality of IF signals into a second filtered IF signal, wherein the second amplifying module amplifies the second filtered IF signal to produce a second signal (see figure 1, first IF stage BPF 17-1, AMP 22-1, second IF stage 17-2, AMP 22-2, col.7, ln.5-51).

Regarding claims 4 and 17, Peterzell further teaches the integrated multi-mode radio receiver wherein the multiplexor (i.e., multi-pole switch) operable to couple the one of the plurality of IF signals to the first IF stage when the operational mode is in accordance with 802.11b; and the multiplexor operable to couple the one of the plurality of IF signals to the second IF stage when the operational mode is in accordance with Bluetooth (see figure 3, multi-pole switch, col.2, [0021]).

Regarding claims 5 and 18, Ninomiya further teaches the integrated multi-mode radio receiver wherein the plurality of IF stages further comprises: third IF stage including third filtering module and third amplifying module, wherein the third filtering module is operably coupled to filter a further one of the plurality of IF signals to produce a third filtered IF signal, wherein the third amplifying module amplifies the filtered IF signal to produce a third signal, and wherein gain of the third amplifying module is programmable within the IF gain range based on the power level of the RF signal (see figure 1, third IF stage BPF 17-n, AMP 22-n, col.7, ln.5-51).

Regarding claims 6 and 19, Peterzell further teaches the integrated multi-mode radio receiver further comprises: the multiplexor operable to couple the one of the plurality of IF signals to the first IF stage when the operational mode is in accordance with 802.11a; the multiplexor operable to couple the one of the plurality of IF signals to the second IF stage when the operational mode is in accordance with Bluetooth; and the multiplexor operable to couple the one of

the plurality of IF signals to the third IF stage when the operational mode is in accordance with 802.11b (see figure 3, multi-pole switch, col.2, [0021]).

Regarding claim 7, Peterzell further teaches the integrated multi-mode radio receiver wherein the first IF stage further comprises: DC feedback circuit operably coupled to an input of the first filtering module and to an output of the first amplifying module (see col.7, [0085-0089]).

Regarding claim 8, Peterzell further teaches the integrated multi-mode radio receiver wherein the first IF stage further comprises: an analog to digital converter operably coupled to convert the first signal into a digital signal; and demodulator operably coupled to demodulate the digital in accordance with the selection signal to recapture data (see figure 3, ADC 135, figure 4, col.8, [0093]).

Regarding claim 9, Peterzell further teaches the integrated multi-mode radio receiver further comprises: power detection logic operably coupled to determine the power level of RF signal and to produce gain adjustment signals therefrom (see col.7, [0080-0089]).

Regarding claims 10 and 20, Peterzell further teaches the integrated multi-mode radio receiver wherein the mixing module further comprises: I mixer operably coupled to mix the amplified RF signal with an I oscillation to produce an I intermediate frequency signal; and Q mixer operably coupled to mix the amplified RF signal with a Q oscillation to produce a Q intermediate frequency signal, wherein the one of the plurality of IF signals includes the I and Q intermediate frequencies (see figure 5, I mixer 340A, Q mixer 340B, I signal path 365A, Q signal path 365B).

Regarding claim 16, Peterzell teaches an integrated multi-mode radio receiver comprises (see figure 3): shared front-end including a low noise amplifier and a mixing module (see figure 3, LNA 30, mixer 60), wherein gain of the low noise amplifier is programmable over a range of gain based on a gain setting signal, wherein the low noise amplifier is operably coupled to amplify a radio frequency (RF) signal to produce an amplified RF signal, wherein the mixing module converts the amplified RF signal into one of a plurality of intermediate frequency (IF) signals based on an operational selection signal (see figure 3, plurality IF filter 70, col.2, [0026-0029]) and multiplexer (i.e., multi pole switch) couple to the share front end (see figure 3, multi pole switch is working the same function as multiplexer).

It should be noticed that Peterzell fails to clearly teach first IF section including first filtering module and first amplifying module, wherein gain of the first amplifying module is programmable over an IF gain range based on an IF gain setting signal, wherein the first filtering module is operably coupled to filter the one of the plurality of IF signals into a first filtered IF signal, wherein the first amplifying module amplifies the first filtered IF signal based on a gain programmed in accordance with the gain setting signal to produce a first IF signal, wherein the IF gain range and the range of gain are based on performance requirements for converting the RF signal into the first signal; second IF section including second filtering module and second amplifying module, wherein gain of the second amplifying module is set to a gain within the IF gain range, wherein the second filtering module is operably coupled to filter

another one of the plurality of IF signals into a second filtered IF signal, wherein the second amplifying module amplifies the second filtered IF signal to produce a second signal; and the multiplexor provides the one of the plurality of IF signals to the first IF section and provides the another one of the plurality of IF signals to the second IF section based on the operational selection signal. However, Ninomiya teaches such features (see figure 1, first IF stage BPF 17-1, AMP 22-1, second IF stage 17-2, AMP 22-2, col.7, ln.5-51) for a purpose of supporting multi mode receiver.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of first IF section including first filtering module and first amplifying module, wherein gain of the first amplifying module is programmable over an IF gain range based on an IF gain setting signal, wherein the first filtering module is operably coupled to filter the one of the plurality of IF signals into a first filtered IF signal, wherein the first amplifying module amplifies the first filtered IF signal based on a gain programmed in accordance with the gain setting signal to produce a first IF signal, wherein the IF gain range and the range of gain are based on performance requirements for converting the RF signal into the first signal; second IF section including second filtering module and second amplifying module, wherein gain of the second amplifying module is set to a gain within the IF gain range, wherein the second filtering module is operably coupled to filter another one of the plurality of IF signals into a second filtered IF signal, wherein the second amplifying module amplifies the second filtered IF signal to produce a

second signal; and the multiplexor provides the one of the plurality of IF signals to the first IF section and provides the another one of the plurality of IF signals to the second IF section based on the operational selection signal, as taught by Ninomiya, into view of Peterzell in order to save the manufacture cost and time to made a small receiver for supporting multi frequencies.

Regarding claim 39, Peterzell teaches an integrated multi-mode radio receiver comprises (see figure 3): shared front-end (see figure 3, LNA 30, RXBPF 40, RF AMP 50, Mixer 60) operably coupled to receive a radio frequency (RF) signal that is modulated in accordance with one of a plurality of operational modes (see figure 5, duplexer 312, col.4, [0054-0056), wherein the shared front-end converts the RF signal into one of a plurality of intermediate frequency (IF) signals based on a selection signal that is indicative of the one of the plurality of operational modes (see figure 3, plurality of IF filter 70, col.4, [0052-0060]) and multiplexer (i.e., multi pole switch) couple to the share front end (see figure 3, multi pole switch is working the same function as multiplexer).

It should be noticed that Peterzell fails to clearly teach plurality of intermediate frequency (IF) stages; and multiplexor (i.e., Switch) operably coupled to the shared front-end and to the plurality of IF stages, wherein the multiplexor provides the one of the plurality of IF signals to one of the plurality of IF stages based on the selection signal, plurality of transmitter intermediate frequency (IF) stages, wherein each of the plurality of transmitter IF stages generates a corresponding intermediate frequency (IF) signal from a corresponding input signal, wherein each of the plurality of transmitter IF stages

corresponds to a particular one of the plurality operational modes; transmitter multiplexor operably coupled to the plurality of transmitter IF stages, wherein the transmitter multiplexor selects the IF signal of one of the plurality of transmitter IF stages based on the selection signal that is indicative of the particular operational mode of the one of the plurality of transmitter IF stages; and transmitter front-end operably coupled to receive the selected IF signal, wherein the transmitter front-end converts the selected IF signal into an outbound radio frequency (RF) signal that is modulated in accordance with the particular operational mode of the one of the plurality of transmitter IF stages. However, Ninomiya teaches such features (see figure 1, switch 14, plurality IF stage 17n, switch controller 16, col.7, ln.5-52, figure 17, transmitter IF filters stage 17-1 to 17-n, switch 14, front end 13) for a purpose of supporting multi mode receiver.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of plurality of intermediate frequency (IF) stages; and multiplexor (i.e., Switch) operably coupled to the shared front-end and to the plurality of IF stages, wherein the multiplexor provides the one of the plurality of IF signals to one of the plurality of IF stages based on the selection signal, plurality of transmitter intermediate frequency (IF) stages, wherein each of the plurality of transmitter IF stages generates a corresponding intermediate frequency (IF) signal from a corresponding input signal, wherein each of the plurality of transmitter IF stages corresponds to a particular one of the plurality operational modes; transmitter multiplexor operably coupled to the plurality of transmitter IF stages, wherein the

transmitter multiplexor selects the IF signal of one of the plurality of transmitter IF stages based on the selection signal that is indicative of the particular operational mode of the one of the plurality of transmitter IF stages; and transmitter front-end operably coupled to receive the selected IF signal, wherein the transmitter front-end converts the selected IF signal into an outbound radio frequency (RF) signal that is modulated in accordance with the particular operational mode of the one of the plurality of transmitter IF stages, as taught by Ninomiya, into view of Peterzell in order to save the manufacture cost and time to made a small receiver for supporting multi frequencies.

3. Claims 21- 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ninomiya et al. (U.S. Patent No.: 5,940,029, hereinafter, "Ninomiya") in view of Peterzell et al. (Pub. No.: US 2002/0132597, hereinafter, "Peterzell").

Regarding claim 21, Ninomiya teaches a transmitter comprises a plurality of intermediate frequency (IF) stages (see figure 17, plurality IF stage 17-1 to 17-n), wherein each of the plurality of IF stages generates a corresponding intermediate frequency (IF) signal from a corresponding input signal, wherein each of the plurality of IF stages corresponds to a particular one of a plurality operational modes (see figure 17, col.17, ln.50-67); multiplexor (i.e., switch14) operably coupled to the plurality of IF stages, wherein the multiplexor selects the IF signal of one of the plurality of IF stages based on a selection signal that is indicative of the particular operational mode of the one of the plurality of IF stages (figure 17, switch 14 selects for different frequencies band); and shared

front-end (see figure 17, front end 13) operably coupled to receive the selected IF signal, wherein the shared front-end converts the selected IF signal into a radio frequency (RF) signal that is modulated in accordance with the particular operational mode of the one of the plurality of IF stages (see col.18, ln.2-55).

It should be noticed that Ninomiya fails to teach a multi mode radio. However, Peterzell teaches a multi mode radio for a purpose of supporting multi mode receiver.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use of multi mode radio, as taught by Peterzell, into view of Ninomiya in order to save the manufacture cost and time to made a small receiver for supporting multi frequencies.

Regarding claim 22, Ninomiya further teaches the integrated multi-mode radio transmitter, wherein the shared front-end further comprises: mixing module operably coupled to convert the selected IF signal into a representative RF signal; and power amplifier having programmable gain, wherein the power amplifier is operably to amplify the representative RF signal to produce the RF signal, wherein the programmable gain is set within a range of gain based on desired power level of the RF signal (see figure 17, AMP 13a, mixer 13c, in the transmit path the mixer 13c convert the IF to RF for transmit the signal).

Regarding claim 23, Ninomiya further teaches the integrated multi-mode radio transmitter wherein the plurality of IF stages further comprises: first IF stage including first filtering module and first amplifying module, wherein the first filtering module is operably coupled to filter the corresponding input signal of a

first one of the plurality of IF stages to produce a filtered input signal, wherein the first amplifying module amplifies the filtered input signal to produce the corresponding IF signal, and wherein gain of the first amplifying module is programmable within an IF gain range based on the power level of the RF signal; and second IF section including second filtering module and second amplifying module, wherein gain of the amplifying module is set to a gain within the IF gain range, wherein the second filtering module is operably coupled to filter the corresponding input signal of a second one of the plurality of IF stages into a second filtered input signal, wherein the second amplifying module amplifies the second filtered input signal to produce a second corresponding IF signal (see figure 17, first IF stage 17-1, first filter 17-1, APM 22-1, second IF stage 17-2, second filter 17-2, AMP 22-2, col.18, ln.2-55).

Regarding claims 24 and 26, Peterzell further teaches the integrated multi-mode radio transmitter further comprises: the multiplexor operable to couple the corresponding IF signal to shared front-end when the operational mode is in accordance with 802.11b; and the multiplexor operable to couple the second corresponding IF signal to the shared front-end when the operational mode is in accordance with Bluetooth (see figure 3, multi-pole switch, col.2, [0021]).

Regarding claim 25, Ninomiya further teaches the integrated multi-mode radio transmitter wherein the plurality of IF stages further comprises: third IF stage including third filtering module and third amplifying module, wherein the third filtering module is operably coupled to filter the corresponding input signal of

a third one of the plurality of IF stages to produce a third filtered input signal, wherein the third amplifying module amplifies the third filtered input signal to produce a third corresponding IF signal, and wherein gain of the third amplifying module is programmable within an IF gain range based on the power level of the RF signal (see figure 17, third IF stage, third filter 17-n, AMP 22-n, col.18, ln.2-55).

4. Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ninomiya et al. (U.S. Patent No.: 5,940,029, hereinafter, "Ninomiya") in view of Peterzell et al. (Pub. No.: US 2002/0132597, hereinafter, "Peterzell") as applied to claim 21 above, and further in view of Simon et al. (U.S. Patent No.: 6,369,666, hereinafter, "Simon").

Regarding claim 27, Ninomiya and Peterzell, in combination, fails to clearly teach modulator operably coupled to modulate data in accordance with the selection signal to produce modulated data. However, Simon teaches such features (see figure 1, modulator 200, col.6, ln.7-10) for a purpose of convert voice or data to a form for transmitting.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the use teach modulator operably coupled to modulate data in accordance with the selection signal to produce modulated data, as taught by Ninomiya and Peterzell, into view of Simon in order to save the manufacture cost and time to made a small receiver for supporting multi frequencies.

Regarding claim 28, Simon further teaches I mixer operably coupled to mix an I component of the selected IF signal with an I oscillation to produce an I intermediate frequency signal; Q mixer operably coupled to mix a Q component of the selected IF signal with a Q oscillation to produce a Q intermediate frequency signal; and summing module operably coupled to sum the I and Q intermediate frequency signals to produce the representative RF signal (see figure 2, I mixer 201, 208, Q mixer 202, 207 and sum, col.7, ln.30-67).

Allowable Subject Matter

5. Claims 11-15, 29-38, and 40-41 are allowed.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In order to expedite the prosecution of this application, the applicants are also requested to consider the following references. Although Pittman et al. (U.S. Patent No. 5,944,281), Dolman et al. (Pug. No. US 2003/0043769), McDonough (U.S. Patent No. 5,778,024), and Abbey (U.S. Patent No. 6,151,354) are not applied into this Office Action; they are also called to Applicants attention. They may be used in future Office Action(s). These references are also concerned for supporting the system and method of multi-mode, multi-band, multi-user radio system.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Tuan A. Pham** whose telephone number is (703) 305-4987. The examiner can normally be reached on Monday through Friday, 8:00 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Curtis Kuntz can be reached on (703) 305-4708 and **IF PAPER HAS BEEN MISSED FROM THIS OFFICIAL ACTION PACKAGE, PLEASE CALL Customer Service at (703) 306-0377 FOR THE SUBSTITUTIONS OR COPIES.**

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have question on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Art Unit 2643
January 7, 2005
Examiner

Tuan Pham

CURTIS KUNTZ
SUPERVISORY PATENT EXAMINER
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